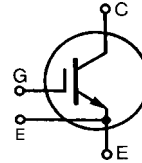


# HiPerFAST™ IGBT

# IXGN 50N60B

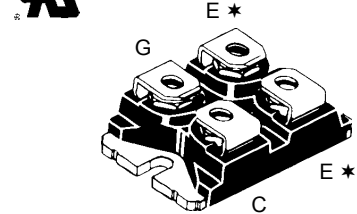
$V_{CES} = 600\text{ V}$   
 $I_{C25} = 75\text{ A}$   
 $V_{CE(sat)} = 2.3\text{ V}$   
 $t_{fi(typ)} = 120\text{ ns}$

Preliminary data sheet



Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{CGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1\text{ M}\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	75	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	50	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1\text{ ms}$	200	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15\text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 10\ \Omega$ Clamped inductive load, $L = 30\ \mu\text{H}$	$I_{CM} = 100$ @ $0.8 V_{CES}$	A
$P_C$	$T_C = 25^\circ\text{C}$	300	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$M_d$	Mounting torque Terminal connection torque (M4)	1.5/13 1.5/13	Nm/lb.in.
$V_{isol}$	RMS, $t = 1\text{ minute}, 50/60\text{ Hz}$	2500	V
<b>Weight</b>		30	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

SOT-227B miniBLOC  
E153432



G = Gate, C = Collector, E = Emitter  
\* Either emitter terminal can be used as Main or Kelvin Emitter

### Features

- International standard package SOT-227B
- Aluminium nitride isolation - high power dissipation
- Isolation voltage 3000 V~
- Very high current, fast switching IGBT
- Low  $V_{CE(sat)}$  for minimum on-state conduction losses
- MOS Gate turn-on drive simplicity
- Low collector-to-case capacitance (< 50 pF)
- Low package inductance (< 5 nH) - easy to drive and to protect

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 250\ \mu\text{A}, V_{GE} = 0\text{ V}$	600		V
$V_{GE(th)}$	$I_C = 250\ \mu\text{A}, V_{CE} = V_{GE}$	2.5		V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{ V}$ $T_J = 125^\circ\text{C}$			200 $\mu\text{A}$ 1 mA
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$			$\pm 100\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}, V_{GE} = 15\text{ V}$			2.3 V

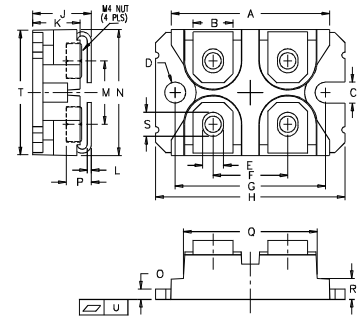
### Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

### Advantages

- Easy to mount with 2 screws
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$I_C = I_{C90}$ ; $V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	25	42	S
$C_{ies}$	$V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$ , $f = 1\text{ MHz}$		4100	pF
$C_{oes}$			310	pF
$C_{res}$			95	pF
$Q_G$	$I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.5 V_{CES}$		160	nC
$Q_{GE}$			30	nC
$Q_{GC}$			55	nC
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$ $V_{CE} = 0.8 V_{CES}$ , $R_G = R_{off} = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		50	ns
$t_{ri}$			50	ns
$t_{d(off)}$			150	250 ns
$t_{fi}$			120	250 ns
$E_{off}$			3	4.5 mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$ , $L = 100\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$ , $R_G = R_{off} = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		50	ns
$t_{ri}$			60	ns
$E_{on}$			3	mJ
$t_{d(off)}$			200	ns
$t_{fi}$			250	ns
$E_{off}$	4.2	mJ		
$R_{thJC}$			0.42	K/W
$R_{thCK}$		0.05		K/W

**miniBLOC, SOT-227 B**


M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	38.00	38.23	1.496	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004

IXYS reserves the right to change limits, test conditions, and dimensions.

 IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:
 

4,835,592	4,881,106	5,017,508	5,049,961	5,187,117	5,486,715	6,306,728B1
4,850,072	4,931,844	5,034,796	5,063,307	5,237,481	5,381,025	

Figure 1. Saturation Voltage Characteristics

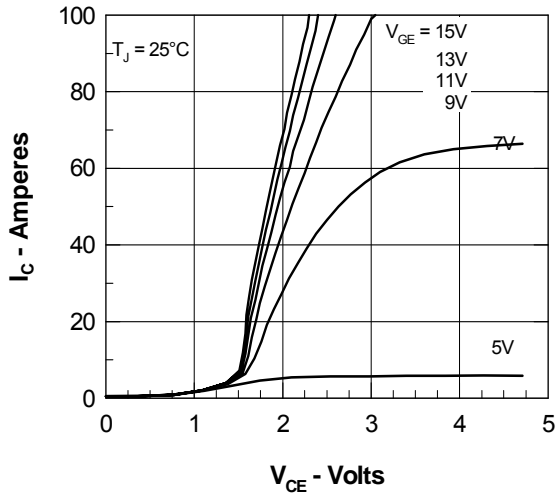


Figure 2. Extended Output Characteristics

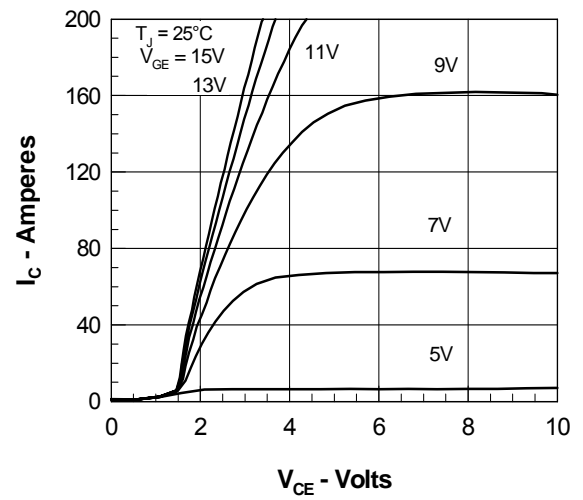


Figure 3. Saturation Voltage Characteristics

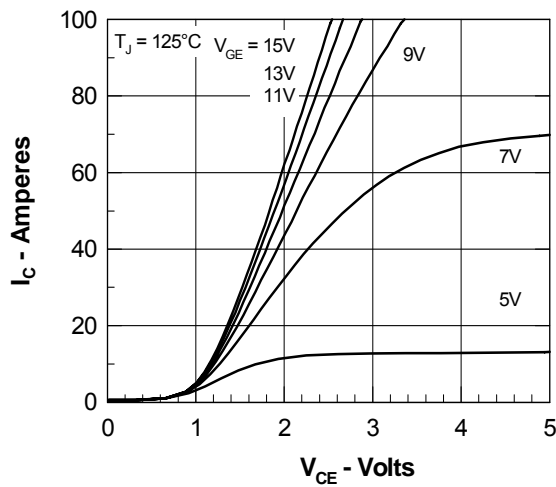
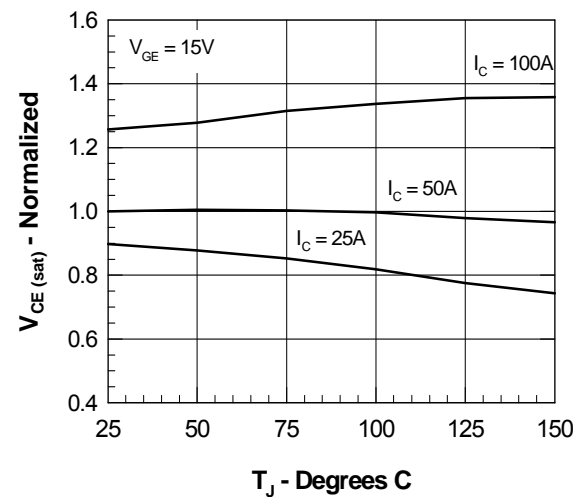

 Figure 4. Temperature Dependence of  $V_{CE(sat)}$ 


Figure 5. Admittance Curves

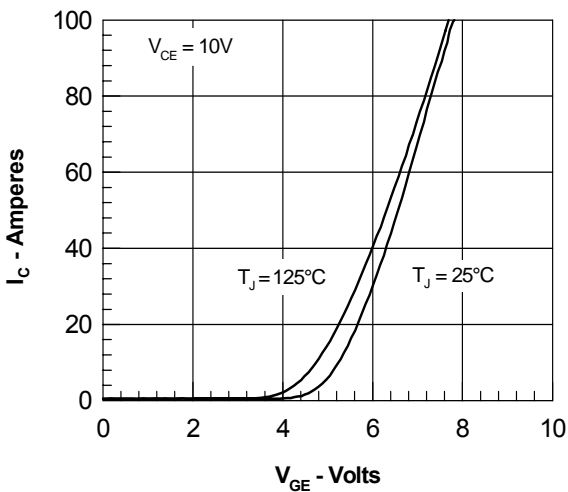


Figure 6. Capacitance Curves

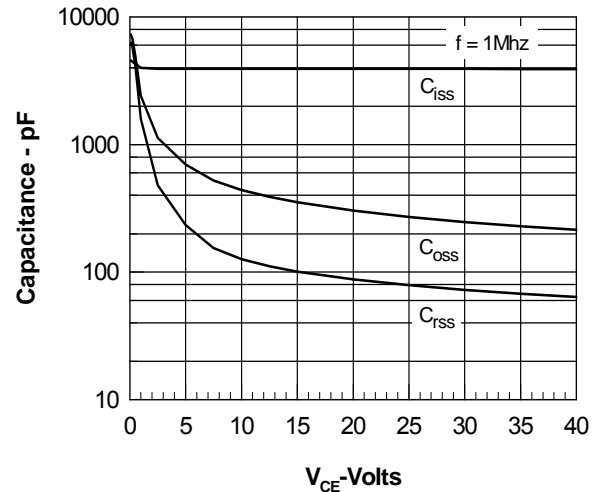


Figure 7. Dependence of  $E_{ON}$  and  $E_{OFF}$  on  $I_C$

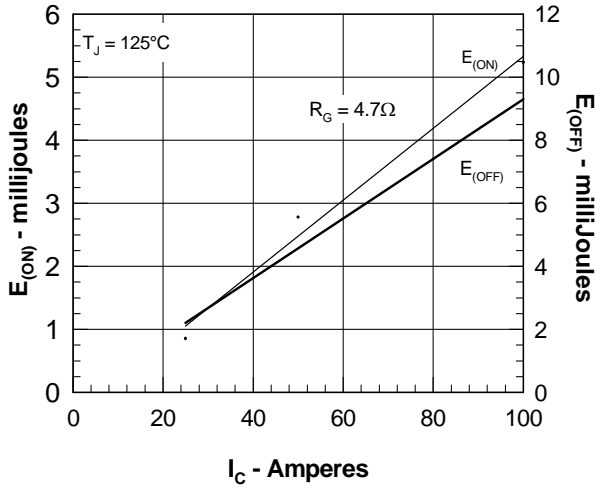


Figure 8. Dependence of  $E_{ON}$  and  $E_{OFF}$  on  $R_G$

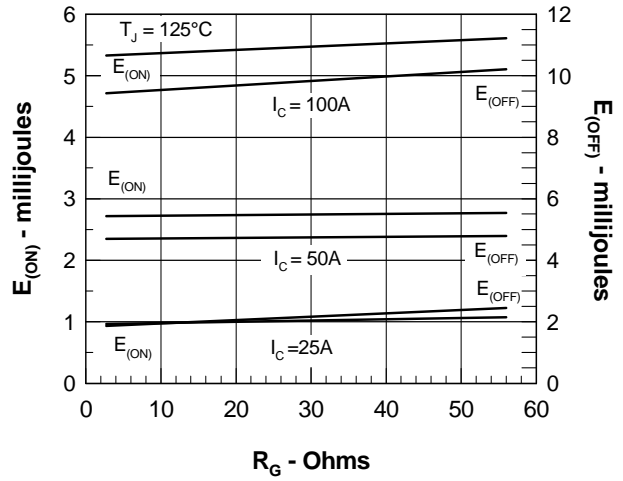


Figure 9. Gate Charge

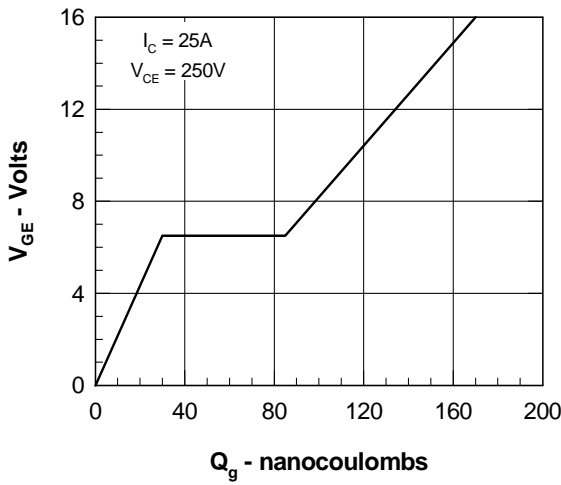


Figure 10. Turn-off Safe Operating Area

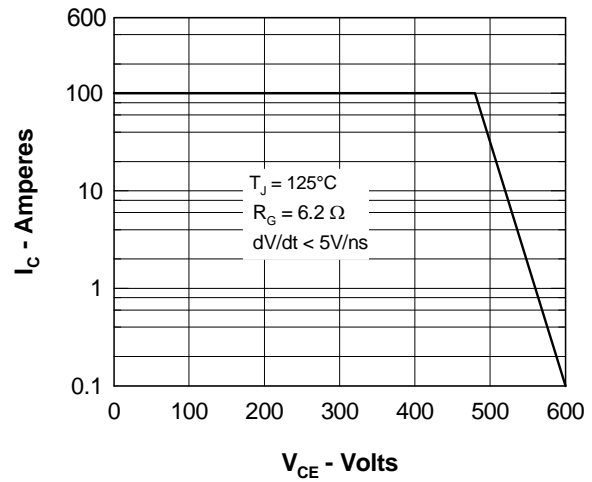
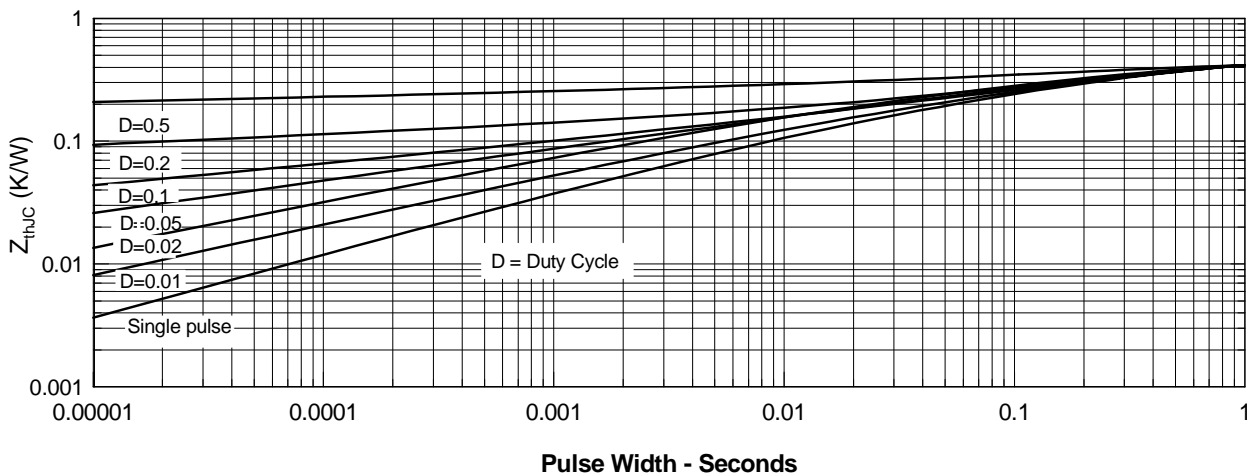


Figure 11. IGBT Transient Thermal Resistance



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